

Greg Trafton

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Education

- 1989–1994 **Ph.D in Psychology**, *Princeton University*, Princeton, NJ.
- 1989–1991 **M.A. in Psychology**, *Princeton University*, Princeton, NJ.
- 1985–1989 **B.S. in Computer Science; Second major in psychology**, *Trinity University*, San Antonio, TX.

Experience

- 2006–present **Section Head for the Intelligent Systems Section, Artificial Intelligence Center**, *Naval Research Laboratory*, Washington, DC.
- 1995–2006 **Computer Scientist**, *Naval Research Laboratory*, Washington, DC.
- 1995–present **Affiliate/Adjunct Professor**, *George Mason University*, Fairfax, VA.

Research Interests

Computational Cognitive Modeling
Human Robot Interaction
Cognitive Robotics
Error prediction and prevention
Interruptions and resumptions
Scientific Visualizations and reasoning
Uncertainty

Teaching Experience

Scientific Visualization
An Introduction to Cognitive Science
Learning Environment and HCI
Human Robot Interaction

Students

Susan Trickett (Affiliate Professor at the University of Denver)
Nick Cassimatis (Founder, Unitary Labs / Associate Professor at Rensselaer Polytechnic Institute)
Chris Monk (Department of Transportation)
Melissa Beck (Associate Professor at Louisiana State University)
Sarah Kriz (Assistant Professor at University of Washington)
Bill Kennedy (Research Professor at George Mason University)
Anthony Harrison (Government employee at the Naval Research Laboratory)

Raj Ratwani (Research Scientist at National Center for Human Factors Engineering in Healthcare)

Laura Hiatt (Government employee at the Naval Research Laboratory)

Eric Martinson (Research Scientist at SOAR Technologies)

Lilia Moshkina (Research Scientist at SOAR Technologies)

Sangeet Khemlani (Government employee at the Naval Research Laboratory)

Dan Gartenberg (Penn State)

Frank Tamborello (Research Scientist at University of Texas, Health Science Center)

Priya Narayanan (Government employee at the Army Research Laboratory)

Funding

Agent-Based Architectures. Office of Naval Research. 600K over 3 years (1997-1999). Aha, D., Ballas, J., & Trafton, J. G.

Improved Human System Process for METOC. Office of Naval Research. 60K. (1999). Ballas, J., & Trafton, J. G.

Spatial Transformations. Office of Naval Research. 31K. (1999). Trafton, J. G.

Language Understanding for Interactive Knowledge Management Naval Research Laboratory/Office of Naval Research. 550K over 2 years (1999-2000). Marsh, E., & Trafton, J. G.

Human Centered Scientific Visualization. Naval Research Laboratory/Office of Naval Research. 900K over 4 years (2000-2003). Trafton, J. G.

Learning new knowledge structures in a cognitive model. Office of Naval Research. 480K over 3 years (2000-2002). Schultz, A. C., & Trafton, J. G.

METOC Human-System Interaction Improvement. Office of Naval Research. 200K over 5 years (2000-2004). Ballas, J., & Trafton, J. G.

Managing Attention in Critical Event Systems. Office of Naval Research. 250K (2000). Schmidt-Nielsen, A., Ballas, J., & Trafton, J. G.

Managing Attention in Critical Event Systems. Office of Naval Research. 125K (2001). Trafton, J. G., & Ballas, J.

Managing Attention in Critical Event Systems. Office of Naval Research. 750K (2002-2004). Trafton, J. G., & Ballas, J.

Environmental Visualization. Office of Naval Research. 1.5 M over 5 years (2002-2007). Ballas, J., & Trafton, J. G.

Mixed initiative control. DARPA MARS 2010 Program. 250K (2003-2004). Schultz, A. C. & Trafton, J. G.

Control of hybrid embodied agents. DARPA COABS Program. 100K (2002-2003). Schultz, A. C. & Trafton, J. G.

Complex problem solving with certain representations of an uncertain world. Office of Naval Research. 92K (2003-2005). Trafton, J. G. (with C. Schunn and S. Kirschenbaum funded under separate grants).

Reducing the disruptive effects of interruptions in complex systems. Office of Naval Research. 525K (2004-2007). Trafton, J. G.

Coping with Information Uncertainty. 400K (2004-2008). Office of Naval Research. Trafton, J. G.

Clutter in Complex Visualizations. 15K (2005). Office of Naval Research. Trafton, J. G.

Clutter in Complex Visualizations. 50K (2006). Office of Naval Research. Trafton, J. G.

Complex problem solving with certain representations of an uncertain world. Office of Naval Research. 280K (2006-2008). Trafton, J. G. (with C. Schunn and S. Kirschenbaum funded under separate grants).

Hybrid Cognitive / Reactive Mechanisms as Reasoning Modules for Collaborative Autonomous Systems . 450K (2006-2008). Office of Naval Research. Schultz, A. and Trafton, J. G.

Multimodal interfaces for high-level human-robot collaborations. 450K (2006-2008). Office of Naval Research. Schultz, A. and Trafton, J. G.

Computational Cognitive Models of Visualization Comprehension. 80K (2006). Office of Naval Research. Trafton, J. G.

Clutter in Complex Visualizations. 50K (2007). Office of Naval Research. Trafton, J. G.

Understanding color to improve performance. 780K (2007-2009). Office of Naval Research. Trafton, J. G.

Robots modeling teammates for better teamwork. 300K (2007-2009). Office of Naval Research. Trafton, J. G.

Robust gesture recognition on a mobile robot. 600K (2008-2010). Office of Naval Research. Trafton, J. G.

Sensor support for robotic triage. 200K (2008). Office of Naval Research. Trafton, J. G.

Predicting necessary Interaction time. 100K (2009). Office of Naval Research. Trafton, J. G.

Predicting and preventing errors in procedural tasks. 900K. (2009-2011). Office of Naval Research. Trafton, J. G.

Perception + context on a mobile robot. 600K (2010-2012). Office of Naval Research. Trafton, J. G.

Predicting SA through visual scanning metrics. 360K (2010-2012). Office of Naval Research. Trafton, J. G.

Predicting and preventing errors. 1050K (2012-2014). Office of Naval Research. Trafton, J. G.

Phenomenology of cognitive models for context and anticipation in HRI. 350K (2011). Office of Naval Research. Trafton, J. G.

Solving the 'status update' problem. 1200K (2013-2015). Office of Naval Research. Trafton, J. G.

Touch gestures on a mobile robot. 600K (2013-2016). Office of Naval Research. Trafton, J. G.

Realizing autonomy via intelligent adaptive hybrid control. 1110K (2014-2016). Office of Secretary of Defense. NRL Lead: Trafton, J. G.

Autonomous squad member. 750K (2014-2016). Office of Secretary of Defense. NRL Lead: Trafton, J. G.

Cognitive Modeling and Anticipation. 850K (2014-2016). Office of Secretary of Defense. Hiatt, L., M., & Trafton, J. G.

Realizing autonomy via intelligent adaptive hybrid control. 1110K (2014-2016). Office of Naval Research. NRL Lead: Trafton, J. G.

Contextual modeling and spatiotemporal reasoning for autonomous systems. 900K (2015-2018). Office of Naval Research. Trafton, J. G.

HRI for shipboard maintenance. 750K (2016-2019). Office of Naval Research. Trafton, J. G.

Combining cognitive and statistical models for teammate understanding. 1200K (2018-2020). Office of Naval Research. Hiatt, L. M., & Trafton, J. G.

Books

- 2017 Hoffman, R. R., LaDue, D. S., Mogil, H.M., Trafton, J. G., & Roebber, P. J. (2017). *Minding the Weather: How expert forecasters think*. Boston, MA: MIT Press.
- 2007 McNamara, D. S., & Trafton, J. G. (2007). *Proceedings of the 29th Annual Cognitive Science Society*. Austin, TX: Cognitive Science Society

Journal Articles

- under review Trafton, J. G., Lawson, W. E., Narber, C., & Trickett, S. B. (under review). Touch sensing for firefighting robots. *Transactions on Human Robot Interaction*.
- 2018 Gartenberg, D., Gunzelmann, G., Hassanzadeh-Behbahani, & Trafton, J. G. (2018). Examining the role of task requirements in the magnitude of the vigilance decrement. *Frontiers in Psychology, 9*.
- 2017 Laird, J. E., Gluck, K., Anderson, J., Forbus, K., Jenkins, O., Lebiere, C., Salvucci, D., Scheutz, M., Thomaz, A., Trafton, G., Wray, R. E., Mohan, S., Kirk, J. R. (2017). Interactive Task Learning. *IEEE Intelligent Systems, 32(4), 6-21*.
- Altmann, E. M., Trafton, J. G., & Hambrick, D. Z. (2017). Effects of Interruption Length on Procedural Errors. *Journal of Experimental Psychology: Applied, 23, 216-229*.
- Hiatt, L.M., Narber, C., Bekele, E., Khemlani, S. S., & Trafton, J. G. (2017). Human Modeling for human-robot collaboration. *International Journal of Research Robotics, 36(5-7)*.
- Hiatt, L. M., & Trafton, J. G. (2017). A familiarity, priming, and perceptual account of similarity judgments. *Cognitive Science, 41(6), 1450-1484*.
- Tamborello, F. & Trafton, J. G. (2017). Human Error as an emergent property of action selection and task-place-holding. *Human Factors, 59(3), 377-392*.
- Thomson, R., Harrison, A. M., Trafton, J. G., & Hiatt, L. M. (2017). An account of interference in associative memory: Learning the fan effect. *Topics in Cognitive Science, 9(1), 69-82*.
- 2015 Altmann, E. M. & Trafton, J. G. (2015). Brief lags in interrupted sequential performance: Evaluating a model and model evaluation method. *International Journal of Human-Computer Studies, 79, 51-65*.
- Heitmeyer, C. L., Pickett, M., Breslow, L., Leonard, E. I., Archer, M. M., Ray, I., Aha, D. W., & Trafton, J. G. (2015). Building High Assurance Human-Centric Decision Systems *Journal of Automated Software Engineering, 22, 159-197*.

- 2014 Altmann, E. M., Trafton, J. G., & Hambrick, D. Z. (2014). Momentary interruptions can derail the train of thought. *Journal of Experimental Psychology: General*, *143*(1), 215-226.
- Gartenberg, D., Breslow, L. A., & Trafton, J. G. (2014). Situation Awareness Recovery. *Human Factors*, *56*(4), 710-727.
- Kirschenbaum, S. S., Trafton, J. G., Schunn, C. D., & Trickett, S. B. (2014). Visualizing Uncertainty: The impact on performance. *Human Factors*, *56*(3) 509-520.
- Breslow, L. A., Gartenberg, D., McCurry, J. M., & Trafton, J. G. (2014). Dynamic Operator Overload: A Model for Predicting Workload During Supervisory Control. *IEEE Transactions on Human-Machine Systems*, *44*(1).
- 2013 Trafton, J. G., Hiatt, L. M., Harrison, A. M., Tamborello, F. P., Khemlani, S. S., & Schultz, A. C. (2013). ACT-R/E: An embodied cognitive architecture for Human-Robot Interaction. *Journal of Human Robot Interaction*, *2*(1), 30-55.
- 2012 Hiatt, L. M., Khemlani, S. S. & Trafton, J. G. (2012). An explanatory reasoning framework for embodied agents. *Biologically Inspired Cognitive Architectures*, *1*(1), 23-31.
- Jang, J., Trickett, S. B., Schunn, C. D., & Trafton, J. G. (2012). Unpacking the temporal advantage of distributing complex visual displays. *International Journal of Human Computer Studies*, *70*, 812-827.
- Trafton, J. G., Jacobs, A., Harrison, A. M. (2012). Building and verifying a predictive model of interruption resumption. *Transactions of IEEE*, *100*(3), 648-659.
- 2011 Trafton, J. G., & Harrison, A. M. (2011). *Embodied Spatial Cognition. Topics in Cognitive Science*. *3*, 686-706
- Ratwani, R. M., & Trafton, J. G. (2011). A Real-Time Eye Tracking System for Predicting Postcompletion Errors. *Human Computer Interaction*. *26*(3), 205-245.
- Thompson, J. C., Trafton, J. G., & McKnight, P. (2011). The perception of humanness from the movement of synthetic agents. *Perception* *40*(6). 695-704.
- Kennedy, W. G., & Trafton, J. G. (2011). How long is a moment: Reality and perception in the performance of a task involving walking. *International Journal of Social Robotics*. *3*. 243-252.
- Cades, D. M., Boehm-Davis, D. A., Monk, C. A., & Trafton, J. G. (2011). Mitigating Disruptive Effects of Interruptions through Training: What Needs to be Practiced? *Journal of Experimental Psychology: Applied*. *17*(2), 97-109.
- Trafton, J. G., Altmann, E. M., & Ratwani, R. M. (2011). A memory for goals model of sequential action. *Cognitive Systems Research*. *12*, 134-143.
- 2010 Ratwani, R. M., & Trafton, J. G. (2010). An Eye Movement Analysis of the Effect of Interruption Modality on Primary Task Performance. *Human Factors*. *52*(3), 370-380.
- Beck, M. R., Lohrenz, M. C., & Trafton, J. G. (2010). Measuring Search Efficiency in Complex Visual Search Tasks: Global and Local Clutter. *Journal of Experimental Psychology: Applied*. *16*(3), 238-250.
- Ratwani, R. M., & Trafton, J. G. (2010). A generalized model for predicting postcompletion errors. *Topics in Cognitive Science*. *2*(1), 154-167.
- Breslow, L., Trafton, J. G., McCurry, J. M., & Ratwani, R. M. (2010). An algorithm for generating color scales for both categorical and ordinal coding. *Color Research and Applications*. *35*(1), 18-28.

- 2009 Trickett, S. B., Trafton, J. G., & Schunn, C. D., (2009). How Do Scientists Respond to Anomalies? Different Strategies Used in Basic and Applied Science. *Topics in Cognitive Science*. 1(4), 711-729.
- Breslow, L., Ratwani, R. M., & Trafton, J. G. (2009). Cognitive Models of the influence of type of color-scale on data visualization tasks. *Human Factors*. 51(3), 321-338.
- Lohrenz, M. C., Trafton, J. G., Beck, M. R., & Gendron, M. L. (2009). A Model of Clutter for Complex, Multivariate, Geospatial Displays. *Human Factors*. 51(1), 90-101. [NRL Alan Berman Award Winner]
- Breslow, L., Trafton, J. G., & Ratwani, R. M. (2009). A perceptual process approach to selecting color scales for complex visualizations. *Journal of Experimental Psychology: Applied*. 15 (1), 25-34.
- Kennedy, W. G., Bugajska, M. D., Harrison, A. M., Trafton, J. G. (2009). "Like-Me" Simulation as an Effective and Cognitively Plausible Basis for Social Robotics. *International Journal of Social Robotics*. 1(2), 181-194.
- 2008 Monk, C. M., Trafton, J. G., & Boehm-Davis, D. A. (2008). The Effect of Interruption Duration and Demand on Resuming Suspended Goals. *Journal of Experimental Psychology: Applied*. 14(4), 299-313. [Lead Article]
- Ratwani, R. M., & Trafton, J. G. (2008). Spatial memory guides task resumption. *Visual Cognition*. 16(8), 1001-1010. [Lead Article]
- Ratwani, R. M., & Trafton, J. G. (2008). Shedding Light on the Graph Schema: Perceptual features vs. invariant structure. *Psychonomics Bulletin and Review*. 15(4) 757-762.
- Ratwani, R. M., Trafton, J. G., & Boehm-Davis, D. A. (2008). Thinking Graphically: Connecting Vision and Cognition during Graph Comprehension. *Journal of Experimental Psychology: Applied*. 14(1) 36-49. [Featured on Cognitive Daily: <http://scienceblogs.com/cognitivedaily/2009/01/>]
- Trafton, J. G. (2008). Theoretical and Practical Developments in Cognitive Models and Agent Technologies Research. *Cognitive Technology*. 13(2), 5-7.
- 2007 Altmann, E. M. & Trafton, J. G. (2007). Timecourse of Recovery from Task Interruption: Data and a Model. *Psychonomics Bulletin and Review*, 14(6), 1079-1084.
- Trickett, S. B. & Trafton, J. G. (2007). "What if...": The Use of Conceptual Simulations in Scientific Reasoning *Cognitive Science*, 31(5), 843-875.
- Kennedy, W. G., & Trafton, J. G. (2007). Long-Term Symbolic Learning. *Cognitive Systems Research*. 8, 237-247.
- 2006 Trafton, J. G., Trickett, S. B., Stitzlein, C. A., Saner, L., Schunn, C. D., & Kirschenbaum, S. S. (2006). The relationship between Spatial Transformations and Iconic Gestures *Spatial Cognition and Computation*. 6(1), 1-29. [Lead Article]
- 2005 Trafton, J. G., Trickett, S. B., & Mintz, F. E. (2005). Connecting internal and external representations: Spatial transformations of scientific visualizations. *Foundations of Science*. 10(1), 89-106.
- Bogacz, S., & Trafton, J. G. (2005). Understanding Dynamic and Static displays: Using Images to Reason Dynamically. *Cognitive Systems Research*. 6(4), 312-319.

- Sofge, D., Bugajska, M., Trafton, J. G., Perzanowski D., Thomas S., Skubic M., Blisard S., Cassimatis N., Brock D., Adams W, & Schultz A. (2005). Collaborating with Humanoid Robots in Space. *International Journal of Humanoid Robotics*. 2(2), 181-201.
- Trafton, J. G., Cassimatis, N. L., Bugajska, M. D., Brock, D. P., Mintz, F. E., & Schultz, A. C. (2005). Enabling effective human-robot interaction using perspective-taking in robots *IEEE Transactions on Systems, Man, and Cybernetics—Part A: Systems and Humans*. 35(4), 460-470.
- Schultz, A. C., & Trafton, J. G. (2005). Towards collaboration with robots in shared space: Spatial perspective and frames of reference. *Interactions*. Xii.2 (March-April), 22-24.
- 2004 Cassimatis, N. L., Trafton, J. G., Bugajska, M. D., & Schultz, A. C. (2004). Integrating Cognition, Perception and Action through Mental Simulation in Robots. *Journal of Robotics and Autonomous Systems*. 49(1-2), 13-23.
- Monk, C., Boehm-Davis, D. A., & Trafton, J. G. (2004). Recovering from Interruptions: Implications for Driver Distraction Research. *Human Factors*. 46(4), 650-663.
- 2003 Trafton, J. G., Altmann, E. M., Brock, D. P., & Mintz, F. E. (2003). Preparing to resume an interrupted task: Effects of prospective goal encoding and retrospective rehearsal. *International Journal of Human Computer Studies*. 58(5), 582-602. [NRL Alan Berman Award Winner]
- 2002 Swoboda, N. & Trafton, J. G. (2002). Conference Report: Diagrams 2002: Theory and Application of Diagrams. *Künstliche Intelligenz [Artificial Intelligence]*. 4/02, p. 45.
- Altmann, E. M. & Trafton, J. G. (2002). Memory for goals: An activation-based model. *Cognitive Science*. 26(1), 39-83.
- 2001 Trafton, J. G. & Trickett, S. B. (2001). Note-Taking for self-explanation and problem solving. *Human Computer Interaction*. 16(1), 1-38. [Lead Article]
- 2000 Trafton, J. G., Kirschenbaum, S. S., Tsui, T. L., Miyamoto, R. T., Ballas, J. A., & Raymond, P. D. (2000). Turning Pictures into Numbers: Extracting and Generating Information from Complex Visualizations. *International Journal of Human Computer Studies* 53 (5), 827-850.
- before 2000 Lipps, A. W., Trafton, J. G., & Gray, W. D. (1998). Animation as documentation: A replication with reinterpretation. *Intercom*, 7, 199-201.
- Trafton, J. G. (1995). A hybrid model using neural networks and ACT-R. *Behavior Research Methods, Instruments, and Computers*, 27 (2), 183-186.
- Trafton, J. G. (1994). The contributions of studying examples and solving problems to skill acquisition. Ph.D thesis: Department of Psychology, Princeton University, Princeton, NJ.
- Merrill, D. C., Reiser, B. J., Ranney, M., & Trafton, J. G. (1992). Effective pedagogical strategies in human tutors and intelligent tutoring systems. *Journal of the Learning Sciences*, 2, 277-306.
- Klein, S. B., Loftus, J., Trafton, J. G., & Fuhrman, R. W. (1992). The use of exemplars and abstractions in trait judgments: A model of trait knowledge about the self and others. *Journal of Personality and Social Psychology*, 63, 739-753.

Major Videos

- 2014 Harrison, A. M., Hiatt, L. M., Adams, W. L., Lawson, W., Khemlani, S. S., Tamborello, F., & Trafton, J. G. (2014). Robotic Secrets Revealed, Episode 3: The Furlough Gambit.
- 2012 Martinson, E., Lawson, W., Blisard, S., Harrison, A. M., & Trafton, J. G. (2012). Fighting Fires with Human Robot Teams, IEEE/RSJ International Conference on Intelligent Robots and Systems.
- 2011 Hiatt, L. M., Harrison, A. M., Lawson, W., Martinson, E., & Trafton, J. G. (2011). Robotic Secrets Revealed, Episode 002: The trouble begins. [Won AAAI's "Most Educational Award.]
- Lawson, W., Martinson, E., Apker, T., Walker, P., Bradel, C., & Trafton, J. G. (2011). RobotBusters.
- 2009 Harrison, A. M., Fransen, B. R., Bugajska, M., & Trafton, J. G. (2009). Robotic Secrets Revealed, Episode 001. [Won IJCAI's "Most Informative" Award.]

Book Chapters

- 2009 Trickett, S. B., & Trafton, J. G. (2009). A Primer on Verbal Protocol Analysis. In D., Schmorrow, J., Cohn, & D. Nicholson (Eds.), *The PSI Handbook of Virtual Environments for Training and Education, Volume 1*. (pp. 332-346). Westport, CT: Praeger Security International.
- 2008 Trafton, J. G., & Monk, C. M. (2008). Task Interruptions. In D. A. Boehm-Davis (Ed.), *Reviews of Human Factors and Ergonomics, Volume 3*
- 2007 Trickett, S. B., Trafton, J. G., Saner, L., & Schunn, C. D. (2007). "I don't know what's going on there": The Use of Spatial Transformations to Deal With and Resolve Uncertainty in Complex Visualizations. In M. C. Lovett & Shah, P. (Eds.), *Thinking with data* (pp. 65-86). New York, NY: Lawrence Erlbaum Associates.
- Schunn, C. D., Saner, L. D., Kirschenbaum, S. K., Trafton, J. G., & Littleton, E. B. (2007). Complex visual data analysis, uncertainty, and representation. In M. C. Lovett & Shah, P. (Eds.), *Thinking with data* (pp. 65-86). New York, NY: Lawrence Erlbaum Associates.
- Trafton, J. G., & Hoffman, R. R. (2007). Computer-aided Visualization in Meteorology. In R. R. Hoffman (Ed.), *Expertise out of context* (pp. 337-358). New York, NY: Lawrence Erlbaum Associates.
- Kirschenbaum, S. S., Trafton, J. G., & Pratt, E. A. (2007). Comparative Cognitive Task Analysis. In R. R. Hoffman (Ed.), *Expertise out of context* (pp. 327-336). New York, NY: Lawrence Erlbaum Associates.
- 2006 Trickett, S. B. & Trafton, J. G. (2006). Toward a comprehensive model of graph comprehension: Making the case for spatial cognition. (pp. 286-300). In D. Barker-Plummer, R. Cox, & N. Swoboda (Eds.). *Diagrammatic Representation and Inference*.
- Trafton, J. G., Schultz, A. C., Cassimatis, N. L., Hiatt, L. M., Perzanowski, D., P., Brock D. P., Bugajska M., & Adams W. (2006). Communicating and collaborating with robotic agents (pp. 252-278). In R. Sun (Ed.), *Cognition and Multi-Agent Interaction: From cognitive modeling to social simulation*.

- 2004 Trickett, S. B., Schunn, C. D., & Trafton, J. G. (2004). Puzzles and Peculiarities: How Scientists Attend to and Process Anomalies During Data Analysis (2004). In M. E. Gorman, A. Kincannon, D. Gooding, & R. D. Tweney (Eds.), *Spherical horses and shared toothbrushes: Recent developments in scientific and technological thinking*.
- Trickett, S. B. & Trafton, J. G. (2004). Spatial Transformations in graph comprehension. In A. F. Blackwell, K. Marriott, and A. Shimojima (Eds.). *Diagrammatic Representation and Inference*.
- 2002 Trafton, J. G., Marshall, S., Mintz, F., & Trickett, S. B. (2002). Extracting explicit and implicit information from complex visualizations (pp. 206-220). In M. Hegarty, B. Meyer, & H. Narayanan (Eds.) *Diagrammatic Representation and Inference*.
- Bogacz, S., & Trafton, J. G. (2002). Understanding static and dynamic images (pp. 247–249). In M. Hegarty, B. Meyer, & H. Narayanan (Eds.) *Diagrammatic Representation and Inference*.
- Perzanowski, D., Schultz, A. C., Adams W., Bugajska M., Marsh, E., Trafton, J. G., Brock D., Skubic, M., & Abramson, M. (2002). Communicating with teams of cooperative robots (pp. 185–193). In A. C. Schultz and L. E. Parker (Eds.), *Multi-Robot Systems: From Swarms to Intelligent Automata*, Dordrecht, The Netherlands: Kluwer.
- 1999 Brock, D. & Trafton, J. G. (1999). Cognitive representation of common ground in user interfaces. In Judy Kay (Ed.), *User Modeling*, New York, NY: Springer-Wien. 287-289.

Conference presentations, papers, and technical reports

- 2018 Harrison, A. M., Xu, W., & Trafton, J. G. (2018). User-Centered Robot Head Design: a Sensing Computing Interaction Platform for Robotics Research (SCIPRR). *Proceedings of the 2018 ACM/IEEE international conference on human robot interaction*.
- Zish, K., Aguiar, N., McCurry, J. M. & Trafton, J. G. (2018). A memory for goals account for priming in confidence judgments: Data and a Model. *The 40th Annual Cognitive Science Society Meeting*.
- Zish, K., Aguiar, N., McCurry, J. M., Altmann, E. M. & Trafton, J. G. (2018). The time course recovery of confidence judgments: Data and a Model. *International Conference for Cognitive Modeling, 2018*.
- Aguiar, N., Zish, K., McCurry, J. M. & Trafton, J. G. (2018). Interruptions lead to improved confidence-accuracy calibration: Response time as an internal cue for confidence. *The 40th Annual Cognitive Science Society Meeting*.
- Trafton, J. G., Lawson, W., Harrison, A. M., McCurry, J. M., & Zish, K. (2018). Two models of social influence *ACT-R 2018 Meeting*.
- 2017 Narayanan, P., Bugajska, M. D., Lawson, W., & Trafton, J. G. (2017). Impact of Embodied Training on Object Recognition. *26th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*.
- Zish, K., McCurry, J. M., Aguiar, N., & Trafton, J. G. (2017). Interruptions reduce confidence judgments: Predictions of three sequential sampling models. *The 39th Annual Cognitive Science Society Meeting*.
- Trafton, J. G., McCurry, J. M., Zish, K., Hiatt, L. M., & Khemlani, S. (2017). A cognitive model of social influence. *The 39th Annual Cognitive Science Society Meeting*.
- 2016 Aguiar, N., Zish, K., & Trafton, J. G. (2016). Interruptions Reduce Performance across All Levels of Signal Detection When Estimations of Confidence are Highest. *Human Factors and Ergonomics Conference 2016*.
- Lawson, W., Sullivan, K., Bekele, E., Hiatt, L. M., Goring, R., & Trafton, J. G. (2016). Automated surveillance from a mobile robot. *2016 AAAI Fall Symposium Series*.
- 2015 Trafton, J. G., Harrison, A. M., & Lawson, W. E. (2015). Using spatial representations in gesture to facilitate early word learning: A priming process model. *Fifth Joint IEEE International Conference on Development and Learning and on Epigenetic Robotics (IEEE ICDL-EPIROB 2015)*.
- Tamborello, F., Trafton, J. G., & Altmann, E. M. (2015). Memory processes of sequential action selection. *The 37th Annual Cognitive Science Society Meeting*.
- Tamborello, F., & Trafton, J. G. (2015). Action selection and human error in routine procedures. *Human Factors and Ergonomics Conference 2015*.
- Thomson, R., Pyke, A., Trafton, J. G., & Hiatt, L. M. (2015). An account of associative learning in memory recall. *The 37th Annual Cognitive Science Society Meeting*.
- Hiatt, L. M., & Trafton, J. G. (2015). A computational model of mind wandering. *The 37th Annual Cognitive Science Society Meeting*.
- Hiatt, L. M., & Trafton, J. G. (2015). An activation-based model of routine sequence errors. *The international conference of cognitive modeling, 2015*.
- Zish, K., & Trafton, J. G. (2015). Interruptions can Change the Perceived Relationship between Accuracy and Certainty. *Human Factors and Ergonomics Conference 2015*.

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- Zish, K., Hassanzadeh, S., McCurry, J. M., & Trafton, J. G. (2015). Interruptions can Change the Perceived Relationship between Accuracy and Certainty. *Human Factors and Ergonomics Conference 2015*.
- Gartenberg, D., Gunzelmann, G., Veksler, B. Z., & Trafton, J. G. (2015). Improving vigilance analysis methodology: questioning the successive versus simultaneous distinction. *Human Factors and Ergonomics Conference 2015*.
- 2014 Trafton, J. G., & Ratwani, R. M. (2014). The law of unintended consequences: the case of external subgoal support. *Proceedings of the 32nd Annual conference on Human factors in Computing Systems. ACM*.
- Moshkina, L., Trickett, S. B., & Trafton, J. G. (2014). Social engagement in public places: a tale of one robot *Proceedings of the 2014 ACM/IEEE international conference on human robot interaction*.
- Khemlani, S. S., & Trafton, J. G. (2014). Percentile analysis for goodness-of-fit comparisons of models to data. *Proceedings of the 36th Annual Cognitive Science Society. Austin, TX: Cognitive Science Society*.
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- Lawson, W., Sullivan, K., Bekele, E. T., & Trafton, J. G. (under review). Understanding Tactile Gestures for Human-Robot Interaction. *IEEE Robotics and Automation (ICRA)*.
- Lalajini, A., Hiatt, L., Lawson, W., & Trafton, J. G. (under review). Using Dynamic Cognitive Context to Improve Object Recognition *IEEE Robotics and Automation (ICRA)*.
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- 2013 Hiatt, L. M. & Trafton, J. G. (2013). The Role of Associative Learning in Similarity Judgments. *Proceedings of the 32nd Annual Cognitive Science Society. Austin, TX: Cognitive Science Society*.
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- Pickett, M., Aha, D., & Trafton, J. G. (2013). Acquiring User Models to Test Automated Assistants. *FLAIRS Conference.*
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- Gartenberg, D., Breslow, L.A., McCurry, J.M., & Trafton, J.G. (2012). Time Pressure, Memory, and Task Knowledge Facilitate the Opportunism Heuristic in Dynamic Tasks. *Proceedings of the Human Factors and Ergonomics Society 56th Annual Meeting.*
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- Gartenberg, D. I., McCurry, J. M., & Trafton, J. G. (2011). Situation awareness reacquisition in a supervisory control task. *Proceedings of the Human Factors and Ergonomics Society 55th Annual Meeting.*
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- 2008 Kennedy, W. G. and Trafton, J. G. (2008). The Mathematics of Novelty as the Basis of the Exponential Law of Learning, The 41st Annual Society for Mathematical Psychology Conference. Washington, DC.
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- Cades, D. M., Werner, N., Trafton, J. G., Boehm-Davis, D. A., & Monk, C. A. (2008). Dealing with Interruptions can be Complex, but does Interruption Complexity Matter: a Mental Resources Approach to Quantifying Disruptions. *Proceedings of the Human Factors and Ergonomics Society 52nd Annual Meeting*.
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- Brock, D., McClimens, B., Trafton, J. G., McCurry, M., & Perzanowski, D. (2008). Evaluating listeners' attention to and comprehension of spatialized concurrent and serial talkers at normal and a synthetically faster rate of speech. *Proceedings of the 14th International Conference on Auditory Display (ICAD)*.
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- Cades, D. M., Trafton, J. G., Monk, C. M., & Boehm-Davis, D. A. (2007). Does the Difficulty of an Interruption Affect our Ability to Resume? *Proceedings of the Human Factors and Ergonomics Society 51st Annual Meeting*.

- 2006 Ratwani, R. M., & Trafton, J. G. (2006). Now, where was I? Examining the Perceptual Processes while Resuming an Interrupted Task. *The proceedings of the twenty-eighth annual conference of the cognitive science society*.
- Ratwani, R. M., & Trafton, J. G. (2006). Helpful or harmful? Examining the effects of interruptions on task performance. *Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting*.
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- Squire, P., Trafton, J. G., Parasuraman, R. (2006). Human Control of Multiple Unmanned Vehicles: Effects of Interface Type on Execution and Task Switching Times. Human Robot Interaction.
- 2005 Trafton, J. G., Schultz, A. C., Bugajska, M., Mintz, F. E. (2005). Perspective-taking with robots: Experiments and models. *Proceedings of the 14th IEEE International Workshop on Robot and Human Interactive Communication*.
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- 2004 Trafton, J. G. (2004). Uncertainty and Spatial Transformations in Complex Visualizations. NATO workshop on Visualisation and the Common Operational Picture (VizCOP).
- Trafton, J. G. (2004). Dynamic Mental Models in weather forecasting. *Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting*.

- Ratwani, R. M., Trafton, J. G., & Boehm-Davis, D. A. (2004). From Specific Information Extraction to Inferences: A Preliminary Framework of Graph Comprehension. *Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting*.
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- Trafton, J. G., Hegarty, M., Tversky, B., Schunn, C. D., Cassell, J., & Alibali, M. (2004). The relationship between spatial cognition and gestures. *The proceedings of the twenty-fourth annual conference of the cognitive science society*.
- Altmann, E. M., & Trafton, J. G. (2004). Task interruption: Disruptive effects and the role of cues. *The proceedings of the twenty-sixth annual conference of the cognitive science society*.
- Ratwani, R. M., & Trafton, J. G. (2004). Making Graphical Inferences: A Hierarchical Framework. *The proceedings of the twenty-sixth annual conference of the cognitive science society*.
- Trickett, S. B., & Trafton, J. G. (2004). Use of Spatial Transformations in Graph Comprehension. *The proceedings of the twenty-sixth annual conference of the cognitive science society*.
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- Sofge, D. Trafton, J. G., Cassimatis, N., Perzanowski, D., Bugajsk, M. D., Adams, W., & Schultz, A. (2004). Human-Robot Collaboration and Cognition with an Autonomous Mobile Robot. *Proceedings of the 8th Conference on Intelligent Autonomous System*.
- 2003 Trickett, S. B., Watkins, T. E., & Trafton, J. G. (2003). How Novices Reason about Anomalies. *The proceedings of the twenty-fifth annual conference of the cognitive science society*.
- Ratwani, R. M., Trafton, J. G., & Boehm-Davis, D. A. (2003). Thinking Graphically: Extracting local and global information. *The proceedings of the twenty-fifth annual conference of the cognitive science society*.
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- Trafton, J. G., Altmann, E. M., & Brock, D. P. (2003). The Disruptiveness of Interruptions. *Proceedings of the tenth annual ACT-R workshop*.
- Trafton, J. G., Mintz, F. E., & Ballas, J. A. (2003). Navy forecasters' use of multiple data source on land and at sea. Naturalistic Decision Making.
- Trafton, J. G., Schultz, A., Adams, W., Cassimatis, N. (2003). Playing hide and seek: How much spatial cognition is needed? Proceedings of the International Conference on Cognitive Modeling.
- 2002 Monk, C. M., Boehm-Davis, D. A., & Trafton, J. G. (2002). The attentional costs of interrupting task performance at various stages. *Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting*.
- Trafton, J. G., Shah, P., Freedman, E. G., Kirschenbaum, S., Cheng, P. C-H., & Hegarty, M. (2002). The cognition of complex visualizations. *The proceedings of the twenty-fourth annual conference of the cognitive science society*.

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- Bugasjska, M. D., Schultz, A. C., Trafton, J. G., Taylor, M., & Mintz, F. (2002). Hybrid Cognitive-Reactive Multi-Agent Controller. IROS 2002.
- 2001 Bugasjska, M. D., Schultz, A. C., Trafton, J. G., Gittens, S., & Mintz, F. (2001). Building adaptive computer generated forces: The effect of increasing task reactivity on human and machine control abilities. GECCO01.
- Trafton, J. G., & Trickett, S. B. (2001). A new model of graph and visualization usage (pp. 1048-1053). *The proceedings of the twenty-third annual conference of the cognitive science society*
- Trickett, S. B., Trafton, J. G., Schunn, C. D., & Harrison, A. (2001). "That's Odd!" How Scientists Respond to Anomalous Data. *The proceedings of the twenty-third annual conference of the cognitive science society*
- Trafton, J. G., Schultz, A. C., Bugasjska, M. D., Gittens, S., & Mintz, F. E. (2001). An Investigation of How Humans and Machines Deal with Increases in Reactivity. *The 10th Conference on Computer Generated Forces and Behavioral Representation*.
- Lanzagorta, M. O., Rosenberg, R., & Trafton, J. G. (2001). Cognitive processes in scientific visualization. *The proceedings of the International Society for Optical Engineering 2001*.
- Trafton, J. G. (2001). Spatial Transformations. Invited presentation at the Psychology Department of George Mason University. Fairfax, VA.
- 2000 Trafton, J. G. (2000). Predicting Complex Information Using Qualitative Mental Models. *Human Performance, Situation Awareness, and Automation: User-Centered Design for the New Millennium*, 18-19.
- Schultz, A. C., & Trafton, J. G. (2000). A Hybrid Cognitive and Reactive Architecture. Presented at AAAI.
- Trickett, S. B., Fu, W., Schunn, C. D., & Trafton, J. G. (2000). From Dipsy-Doodles to Streaming-Motions: Changes in Representation in the Analysis of Visual Scientific Data. *The proceedings of the twenty-second annual conference of the cognitive science society*.
- Trickett, S. B., Trafton, J. G., & Schunn, C. D. (2000). Blobs, Dipsy-Doodles and Other Funky Things: Framework Anomalies in Exploratory Data Analysis. *The proceedings of the twenty-second annual conference of the cognitive science society*.
- Altmann, E. M. & Trafton, J. G. (2000). Prospective memory: Proactive, reactive, or both? Invited presentation at NASA.

- Trafton, J. G. (2000). Using Usability. Presented at the Distributed Autonomous Systems Workshop, Naval Research Laboratory. Washington, DC.
- Trafton, J. G. (2000). Turning Pictures into Numbers: The use of Complex Visualizations. Invited presentation at the Psychology Department of George Mason University. Fairfax, VA.
- before 2000 Altmann, E. M. & Trafton, J. G. (1999). Functional encoding in memory for goals. *Proceedings of the 6th annual ACT-R workshop.*
- Altmann, E. M. & Trafton, J. G. (1999). Memory for goals: An architectural perspective. *The proceedings of the twenty-first annual conference of the cognitive science society.*
- Miller, S. L., & Trafton, J. G. (1999). Natural language and direct manipulation search tools in a multimodal information system. *Proceedings of ACM CHI'99 Conference on Human Factors in Computing Systems.*
- Miller, S. L., & Trafton, J. G. (1999). Improving information search using natural language and direct manipulation tools in a multimodal interface. *HFES 43rd Annual Meeting.*
- Trickett, S. B. & Trafton, J. G. (1999). Note-taking as a strategy for learning (pp. 742-748). *The proceedings of the twenty-first annual conference of the cognitive science society.*
- Trickett, S. B. & Trafton, J. G. (1999). Learning and transfer of systematicity. *Poster presented at the twenty-first annual conference of the cognitive science society.*
- Trickett, S. B., Trafton, J. G., & Raymond, P. D. (1998). Exploration in the experiment space: The relationship between systematicity and performance (pp. 1067-1072). *The proceedings of the twentieth annual conference of the cognitive science society.*
- Lipps, A. W., Katz, I. R., & Trafton, J. G. (1998). Factors affecting difficulty of generate and test in algebra problem solving. *Virginia Academy of Science.*
- Lipps, A. W., Katz, I. R., & Trafton, J. G. (1998). Role of solution space in generating examples problems. *Psychonomic Society.*
- Lipps, A. W., Trafton, J. G., & Gray, W. D. (1998). Animation as documentation: A replication with reinterpretation. *The 1998 Society for Technical Communication.*
- Trafton, J. G., Wauchope, K., Raymond, P. D., Deubner, B., Stroup, J., & Marsh, E. (1997). How natural is natural language for Intelligent Tutoring Systems? *The proceedings of the nineteenth annual conference of the cognitive science society.*
- Trafton, J. G., Wauchope, K., & Stroup, J. (1997). Errors and usability of natural language in a multimodal system. *The proceedings of the 15th International Joint Conference on Artificial Intelligence (IJCAI-97).*
- Trafton, J. G. (1996). Alphabet Arithmetic and ACT-R: A reply to Rabinowitz and Goldberg. *The proceedings of the eighteenth annual conference of the cognitive science society.*
- Brock, D. & Trafton, J. G. (1996). A preliminary architecture for the implementation of task model tracing. *Third Annual ACT-R Workshop Proceedings.*
- Airth, M. E. & Trafton, J. G. (1996). An evaluative assessment of APPEX. Naval Research Laboratory.

- Brock, D., Hix, D., Dievendorf, L., & Trafton, J. G. (1995). Extending the user action notation for research in individual differences. *Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting*.
- Sandoval, W. A., Trafton, J. G., & Reiser, B. J. (1995). The Effects of Self-Explanation on Studying Examples and Solving Problems. *The proceedings of the seventeenth annual conference of the cognitive science society*.
- Trafton, J. G. (1995). DACSF: A methodology for creating synthetic tasks. Technical Report: AL/CF-TR-1995-0020. Brooks Air Force Base.
- O'Donnell, B., Eddy, D., Cardenas, B., Trafton, J. G., & Campbell, J. (1995). Development of the situation awareness flight training and simulation evaluation (SAFTE) system: Definition of situation awareness measures and initial development of the flight simulator. Technical Report: AL/CF-TR-1995-0039. Brooks Air Force Base.
- Trafton, J. G. (1994). Studying Examples and Solving Problems: A comparison of two models Rice University, Houston, TX.
- Trafton, J. G. (1994). A hybrid model using neural networks and ACT-R. Annual meeting of the Society for Computers in Psychology.
- Reiser, B. J., Merrill, D., Neel, K., Ranney, M., & Trafton, J. G. (1994). Reasoning-Congruent Learning Environments and Explanatory Guidance: Theory and Results of the GIL Tutoring Project. *Annual Meeting of the American Educational Research Association*.
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- Trafton, J. G., & Reiser, B. J. (1991). Providing natural representations to facilitate novices' understanding in a new domain: Forward and backward reasoning in programming. *The proceedings of the thirteenth annual conference of the cognitive science society* (pp. 923-927). Hillsdale, NJ: Erlbaum.

Conference Chairs

Cognitive Science (2007)

Human Robot Interaction (2011)